Rafferty - Alameda Project

Volume III

Moderator's Report

Initial Environmental Evaluation

Environment Canada
Conservation and Protection

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Rafferty-Alameda Dam Project

Initial Environmental Evaluation

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Environment Canada
Conservation and Protection
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1.0 EXECUTIVE SUMMARY

For decades residents of the Souris River Valley have suffered from periodic floods and inadequate water supply due to the extreme variability in river flow and low precipitation. These twin problems could be significantly improved by constructing dams to prevent flooding and provide the means of storing excess water during high flow periods which could then be available to meet user requirements during low flow periods.

Many studies have been made to explore the viability of flood control, but until recently the cost was judged prohibitive. The entry of North Dakota and Saskatchewan Power into the funding arrangement reduced the project cost to the Saskatchewan government sufficiently to permit development. North Dakota wanted to obtain flood control for Minot and was prepared to cover 40 percent of the cost. Saskatchewan Power needed cooling water for its new power plant and was prepared to fund about 15 percent of the cost. In 1984, the Saskatchewan government decided to proceed with the Project, subject to environmental review, and established the Souris Basin Development Authority (SBDA) to implement that decision.

While the primary objectives of the Project were to provide flood control and secure water supply, the proposed reservoirs would also meet several secondary objectives. They would provide water for the new Shand Power Plant, for municipal requirements and for irrigation. They would permit water-based recreation and the Project would provide benefits from economic development.

Most residents of the Valley were pleased with the decision but environmental organizations and others became concerned because of the environmental impacts that they believed would occur from the dams and flooding a portion of the valley. Consequently they opposed the Project and continue to do so. They contend that the environmental costs may be too high and there may be better alternatives for achieving the same basic objectives of flood control and adequate water supply. They also argue that the secondary objectives are either of questionable merit or could be met by other alternatives.

They suggest that the construction of several smaller dams and the reduction in water requirements would be a better way of obtaining flood control and adequate water supplies. However, evaluations by Environment Canada technical experts have shown that the small dams alternative would be more costly, have greater environmental impacts and would be more difficult to operate in a manner to avoid downstream impacts.

The Project is also questioned or opposed by some Manitobans who contend that it would reduce both the quantity and quality of the water of the Souris River before it enters Manitoba.

The proposed Project underwent an environmental review by an independent Board of Inquiry appointed by the Saskatchewan government in 1987. The Board convened public hearings, at which the concerns of environmental organizations and others were considered. The Board decided to recommend approval of the Project subject to 34 conditions. Provincial approval was given in February 1988. In June 1988, a licence was issued under the International River Improvements Act by the federal Environment Minister.

In January 1989, that decision was challenged in the Federal Court of Canada and on April 10, 1989 the licence was quashed. The Court directed the federal Minister of the Environment to apply the existing federal Environmental Assessment and Review Process (EARP).

Following the Court decision, Environment Canada prepared an initial environment evaluation (IEE) to identify any environmental impacts in areas of federal jurisdiction. The detailed review concluded that there are six significant environmental impacts most of which can be mitigated. The IEE also identified information deficiencies and ways of proceeding to ensure mitigation of the environmental impacts.

The IEE was reviewed and considered at seven public meetings during June 1989 with more than one thousand in attendance and 158 submissions. Participants generally agreed that the IEE assessment was fair and accurately identified the impacts within federal jurisdiction. Environmental organizations contended that another significant impact would be the destruction of that portion of the valley flooded by the reservoir.

The IEE indicates that four of the six significant environmental impacts could be mitigated by adopting comprehensive programs. One of the remaining impacts is the potential loss of the Lake Darling fishery in North Dakota but that government has concluded that obtaining flood relief by the proposed Project is more important. The remaining significant impact is the potential loss of some populations of endangered or rare species of animals or plants. Additionally, there would be the loss of a portion of the river valley through flooding because that impact could not be mitigated.

In summary, the Project could have a significant impact on populations of endangered species and would destroy a portion of the Souris Valley. On the other side of the ledger, the Project would significantly improve the flooding and water supply problems of the residents of the valley. The concerns about the quantity and quality of water delivered to Manitoba could be resolved through operating standards that ensure that

neither quantity nor quality in low flow months would be less than would occur if the Project was not constructed.

Therefore, the basic issue is the relative importance of the residents' needs for flood control and assured water supply versus the possible loss of some populations of endangered or rare species and the loss of a portion of the river. If the Project is not approved then the only alternatives for valley residents are to either continue to suffer from floods and inadequate water supplies or leave the valley. While the environmental impacts are significant and serious, they do not appear to be of such magnitude as to justify such harsh treatment of residents of the valley.

A second issue is how the future review process should proceed. Opponents of the project contended that because there are significant environmental impacts and because the public is concerned, the Minister has no option but proceed with a full public review by the appointment of an independent review panel. Supporters of the Project contended that the impacts are not significant and the Minister should reinstate the licence to permit construction to resume.

This is a unique case that does not fit into the normal categories. Unlike the normal case, the Project has been already subjected to review by the Saskatchewan Board of Inquiry in 1987 as well as the recent public meetings respecting the IEE. The same arguments were presented at both reviews by mostly the same people or organizations. Therefore, the views of the public are known.

The IEE supplements the EIS prepared by the SBDA and draws on all of the available data. While there are information deficiencies, they relate to the operation of the Project and mitigation of environmental impacts. Moreover, it became clear at the IEE public meetings that participants generally accept the findings of the IEE. A further public review would almost certainly lead to a regurgitation of the same arguments that have already been considered twice.

A public review by an independent panel would delay the final decision by one or more years. That would extend the uncertainty for all parties but particularly for valley residents whose lives are significantly affected. And the delay may be much greater because proceeding with the review would result in a Canadian panel convening hearings in the United States which appears fraught with uncertainties and potential problems.

In my view, the information necessary to make an informed and fair decision is available today and nothing would be gained by another round of hearings and argument. Indeed, further hearings would likely increase the dissension between the parties and make final resolution more difficult.

Rather than another round of divisive hearings, consideration should be given to arranging for informal discussions respecting certain key issues. Both sides generally agree with the need for flood control, adequate water supplies and effective water management for the whole basin. Disagreements have developed because there is a doubt about whether the Project represents the best means of achieving these targets, whether operation of the reservoirs would result in Manitoba receiving less water of poorer quality during low flow months and whether the necessary mitigation and monitoring programs to counter environmental impacts would actually proceed and be enforced. Environment Canada representatives are in a position to act in a mediation role and assist in providing answers to these issues. That process could result in much improved communications, input by all parties and hopefully a lessening of the current dissention.

If the decision is to re-issue the licence, then there would be merit in attaching conditions respecting such matters as mitigation of environmental impacts, ground water pumping and wetlands drainage. Additionally, plans should be developed for a basin-wide water management system that would ensure the protection of downstream users and specifically the quantity and quality of water at the Manitoba border. The management system should include representation of all governments involved. There should also be provisions for ensuring participation by the major stakeholders - residents of the valley and environmental organizations. The management plan would also need to provide for a dispute resolution process - probably through the offices of the International Joint Commission.

2.0 INTRODUCTION AND BACKGROUND

The roots of the Rafferty-Alameda Project (the Project) go back to the mid-1930's when consideration was given to a major dam on the Souris River to deal with water supply problems during the drought years. Further studies were made in 1940 and 1957 by the International Joint Commission (IJC) with the focus on flood control and water supply. In the 1970's the governments of Saskatchewan, Manitoba and Canada established the Canada-Manitoba-Saskatchewan Souris River Basin Study Agreement to develop a plan for managing the water and related resources of the Canadian portion of the basin. The study was completed in June, 1978 and concluded that "a viable project involving reservoir storage on the Souris River in Saskatchewan could only be realized in conjunction with a new major industrial use". (IEE page 1-2)

In the early 1980's, Saskatchewan Power Corporation (SPC) concluded that it would require additional electric energy generating capacity to meet future load growth. It planned to construct a 600 megawatt thermal power plant using the lignite reserves in the Estevan area.

In 1984 the Saskatchewan government began planning for the Project because the water cooling required for the proposed power plant provided the industrial requirement that the previous studies had identified.

Saskatchewan also held discussions with United States authorities to assess the feasibility of a jointly funded project. North Dakota and more particularly Minot had suffered major floods in 1969 and 1976. The 1969 flood had been especially serious and required the evacuation of 13,000 residents for 40 days with enormous damage and financial loss. A dam had been constructed on the Souris River upstream from Minot in the 1930's (Lake Darling Reservoir) but was not adequate and North Dakota was investigating its flood control options. It agreed to purchase flood control for a maximum cost of $41 million (1985 U.S. dollars) in a dam on the upper Souris River in Saskatchewan on the understanding that it would provide flood control at Minot for the one-in-a-hundred year flood. North Dakota would also be required to make changes in its existing system which would require some $24 million (1985 U.S. dollars). Thus North Dakota's share of the Project costs would be about 40 percent of the expenditures in Saskatchewan or 50 percent of the total expenditures.

With the identification of a major industrial requirement for a dam and agreement on joint funding from the United States, the Saskatchewan government decided to proceed with the project subject to environmental review. It established the Souris Basin Development Authority (SBDA) to develop a detailed plan that would best meet the needs of all parties. SBDA prepared an Environmental Impact Statement (EIS) in accordance with the provincial review system and in 1987 a Board of Inquiry held public meetings to consider the EIS.

The Canadian Wildlife Federation (CWF) and other environmental organizations participated in the meetings and presented evidence in opposition to the Project. In January, 1988, the Board of Inquiry submitted its report to the Minister of Environment and Public Safety. The report concluded that approval should be given to the Souris Basin Development Authority to proceed with construction of the Project subject to thirty-four conditions. On February 15, 1988 approval to proceed with the Project was issued to the SBDA. In June 1988, a licence was issued under the International River Improvements Act by the federal Environment Minister.

In January, 1989, the CWF filed an application with the Federal Court requesting that the licence be set aside. On April 10, 1989 the Court quashed the licence and ordered the Federal Minister of the Environment to apply the federal Environmental Assessment and Review Process (EARP) to the Project.

Environment Canada then proceeded to prepare an Initial Environmental Evaluation (IEE) respecting possible environmental impacts of the Project on the six areas of federal responsibility:

- international waters;
- migratory birds;
- fish and fish habitat;
- rare and endangered species;
- navigable waters; and
- federal lands.

After the IEE was completed Environment Canada announced that it would convene meetings to permit the public to comment on the report. I was asked to moderate the Canadian meetings in conjunction with Bev Burns, the Director General of Environment Canada's Western and Northern Region. Prior to that request my knowledge of the Project was limited to accounts in the media. Since becoming involved I have reviewed the IEE and several related documents in the public domain.

Seven public meetings were scheduled:

- Regina, Saskatchewan - June 22, 1989
- Oxbow, Saskatchewan - June 23, 1989
- Estevan, Saskatchewan - June 24, 1989
- Melita, Manitoba - June 26, 1989
- Minot, North Dakota - June 27, 1989
- Souris, Manitoba - June 28, 1989
- Brandon, Manitoba - June 29, 1989

At each location Environment Canada convened an "open house" in the afternoon at which technical displays of the project could be viewed and questions asked of the scientists who prepared the IEE.

Evening meetings at each location provided an opportunity for the public to make presentations respecting their views of the IEE and the Project. While time limitation required presentations to be limited to ten minutes, all were advised they could submit written briefs prior to July 10, 1989.

Following presentations of submissions at the evening meetings, the public was provided with another opportunity to ask questions of the scientists who prepared the IEE.

I was also asked to prepare a report summarizing my impressions of the Project and the discussion at the meetings. My initial impression at the conclusion of the meetings was one of confusion. I was impressed by the wide divergence in views expressed by the participants. For example, most of the residents of the valley, particularly those in Saskatchewan, supported the Project, wished it to proceed as quickly as possible and opposed further review because it had already "been studied to death". Environmental organizations expressed many concerns about the Project and appeared to generally oppose it because of its significant environmental impacts. They contended the Minister should follow the next step in the guidelines and appoint an independent panel to conduct a full review. Most North Dakota participants supported the Project because it would provide flood control but some U. S. environmental organizations expressed concern. Some Manitoba residents were in support but others were concerned about possible impacts on Manitoba's water supply - both quantity and quality - and they advocated a full review.

The gulf between the parties was so extreme that at times one wondered whether they were discussing the same project. There were contradictions and misunderstandings as well as heated emotions.

I concluded that in order to arrive at a rational conclusion, one needed to unravel those conflicting views and attempt to identify the basic differences between the various groups. The following commentary is based on that approach. It is not intended to provide recommendations but represents only one person's assessment of a complex problem. Hopefully, it might assist others in taking a fresh approach to this Project.

3.0 VIEWS OF PARTICIPANTS

A total of 158 presentations were made during the seven meetings and additional written submissions were received following the meetings. A summary of the evening meetings is provided in Table One.

TABLE ONE: SUMMARY OF SUBMISSIONS RECEIVED DURING THE PUBLIC MEETINGS

	Attendance At Evening Meetings	Briefs Presented
Regina	250	27
Oxbow	180	22
Estevan	280	30
Melita	170	15
Minot	250 (est.)	28
Souris	120	18
Brandon	90	18
Total:		158

There was a wide diversity of views expressed at the public meetings but most participants either contended that the licence should be re-instated as quickly as possible and construction resume, or contended that further studies be undertaken and an independent EARP panel be appointed for a full scale review of the Project. Additionally, there were those that argued the licence should never have been revoked and others argued that dams are unacceptable and the Project should be rejected out of hand. A few participants took a somewhat different approach and presented ways in which the wide divisions in views could be resolved and compromise solutions found.

Almost all of the submissions related to the overall merits of the Project and there were relatively few specific comments or suggestions about the IEE. Not surprisingly, proponents of the Project identified some areas where they believe the IEE overstates the environmental impact while those arguing for further studies and an independent review suggested the opposite. However, the areas of disagreement with the IEE do not appear to be major and I believe we can accept it as providing a reasonable assessment of environmental impacts for the six areas of federal jurisdiction.

Why do some believe the Project should proceed immediately while others call for more studies and an independent review?

A review of the submissions suggests several possible explanations. The adversarial process that has carried on for several years has led to extremes by both sides -- overstatement of the benefits of the Project and overstatement of the negative impacts. Discussion has been confused because both parties use common terms but with different emphasis. For example, both sides see themselves as protecting the environment but they have somewhat different definitions of the environment. Similarly, both sides see their position as being consistent with new policies of "sustainable development" but they have different perceptions of the river and the Project. Additionally, there are many misunderstandings by both sides about how the Project would likely operate.

However, I suspect that one of the major reasons for the wide difference in viewpoint stems from how each side perceives the objectives of the Project. Residents of the valley view it as serving several important purposes:

- flood control;
- water management and supply;
- providing water for cooling at the Shand power plant, for municipal requirements and for irrigation;
- providing reservoirs that can be used for recreation; and
- providing opportunities for economic development.

Opponents of the Project appear to question or reject most of these objectives because they believe there are either better ways of achieving them or the environmental costs exceed the benefits. For example, they generally accept the need for flood control and adequate water supply but contend there are better alternatives to achieve them. They also believe there are better alternatives to both the Shand Power plant and its cooling. They view the proposed irrigation plans as being uneconomical and environmentally unsound. Indeed, one of the major criticisms of the opponents is that SBDA has not considered or examined the available alternatives.

Another important reason for differing views related to how participants view the need for additional information. Several Manitoba residents expressed concern about the impacts the Project could have on water supply and quality and urged that additional information be obtained before proceeding. Environmental organizations also believe there are information gaps that need resolving.

4.0 ISSUES FOR CONSIDERATION

It is not particularly useful to identify why the participants disagree without offering suggestions as to how those disagreements might be resolved. I suspect that inadequate communication in the past has created many of the misunderstandings. Perhaps a review of the basic issues would "clear the air" and pave the way for better understanding.

A review of the submissions indicates that some matters are more important than others. The desire for flood control and effective management of available water supplies appear to be the paramount issues for the residents of the valley. These two issues have been the basis for previous studies. Indeed, if these problems did not exist there would be no need for the proposed dams. Therefore, there is a need to review these problems to assess whether they are serious, whether the proposed solution to the problems is the best alternative and whether the proposal is appropriate, having regard for environmental impacts.

There are also issues that could arise as a consequence of constructing and operating the proposed dams. For example, the method and arrangements for managing operations, the identification of water requirements that should be met and the mitigation measures that should be taken to minimize impacts.

These issues can be summarized as follows:

1. Primary issues which include consideration of:
   - is flood control justified?
   - are water supplies adequate and effectively managed?
   - is the Project the best alternative?
   - what are the environmental impacts?

2. Secondary issues which include consideration of:
   - water requirements in relation to the supply available from the Project;.
   - the need for basin-wide water management; and
   - other issues identified by participants in the IEE public meetings.

Additionally, consideration needs to be given to the review process and the available options.

5.0 CONSIDERATION OF PRIMARY ISSUES

5.1 The Need For Flood Control

The Souris River basin is shown in Figure 4.1 from the IEE (See Appendix A). The Souris River is characterized by extremes in flow conditions; both on a year-to-year basis and on a season-to-season basis. These conditions and the problems arising from them have led to several studies over the years including the Souris River Basin Study. The introduction to its 1978 report states:

> "Problems associated with flooding, inadequate water supplies and variations in water quality are prevalent in the Souris River basin in Canada. The threat of flooding and the water supply and water quality uncertainties act as a retarding factor to economic development."

The report goes on to state:

> "Flooding in recent years was the focal issue at all public meetings that the Board held throughout the Canadian portion of the basin. The history of flooding on the Souris River can be illustrated by examining the records at some point in the basin. For example, of the seven major spring floods recorded at Wawanesa since 1913, four have occurred in the past nine years, namely, 1969, 1974, 1975 and 1976. The remaining three occurred in 1944, 1956 and 1960." (author's emphasis)

While the total flow in the Souris River varies widely from year to year, there is a relatively constant seasonal pattern illustrated by Figure 5.1 of the IEE (See Appendix A) which shows the historical mean monthly flow. About 80 percent of the annual flow occurs during the spring runoff in March to May.

The extreme variation in flood years is illustrated by Figure 5.3 from the IEE (See Appendix A).

The Souris River Basin Study Report provides detailed information about flooding in the Saskatchewan and Manitoba portion of the basin but does not consider North Dakota. Information on flood damage is given for both the towns and villages along the river as well as for farmers and ranchers operating in the valley.

Many of those making submissions at the evening meetings also described their own experience during previous floods.

Saskatchewan:

"Lives have been lost during the floods ..... Bridges, roads, basements, and houses have had to be rebuilt because of flooding. ... In 1976, ... I witnessed the devastation the flood caused and the despair and frustration of the victims." (Jim Reed, Oxbow Meeting)

One rancher reported that he had been flooded out eight of the ten years from 1969 to 1978 and eventually sold his land to the provincial government. (Jack Muirhead, Estevan Meeting)

"I have watched in the spring of the year, millions of acre feet of water washing down the Souris which had flooded its banks with water from bank to bank of the valley flowing southeastward toward the United States, all of this water coming from the spring thaw of our precious accumulation of Saskatchewan winter snowfall. The tragic part about watching this water flow away from us was the knowledge that within a couple of months or so, we would be crying for water." (Art Matte, Estevan Meeting)

North Dakota:

Both state and municipal representatives as well as Minot residents recounted their experiences with flooding. Particular emphasis was placed on the 1969 flood when 13,000 residents had to be evacuated for 40 days. The damage during that flood has been estimated at $ 30.6 million (1986 U.S. dollars). Following the 1969 flood, North Dakota made modification to the flow channels and the 1976 flood had an estimated cost of $13.5 million even though it was a 1:40 year flood whereas the 1969 flood was 1:25 year.

Manitoba:

At the Melita meeting, several Manitoba residents and municipal representatives recounted their experiences during flood years. For example, "This group [farmers living and working in the valley] has suffered high losses in the flood years like 1950, '54, '69, '76, and '79. In years with little or no runoff, such as we have experienced in the '80's, these same farmers have had poor pasture production and poor quality of water for their cattle and horses to drink during the summer months." (Doug Southam, Melita Meeting)

Mr. Lorne Henry gave an especially detailed description of how his farming operations adjacent to the Assiniboine River were affected by the 1976 flooding of the Souris River. In discussing damage to the land he stated, "... it cost us personally over $15,000 to fill in the holes and try to put the topsoil back where it was before it was eroded. Practically all the river valley farms had a similar devastation. It took some farmers ten years to bring their fields back into working shape, never really getting back into the shape that they were before

the flood. There are at best 50 farm field valleys that had similar destruction." (Lorne Henry, Brandon Meeting)

Clearly those living near the river and affected by past floods view the flood control features of the Project of prime importance. This is particularly true for Minot residents and government representatives who wish to avoid a reoccurrence of 1969 conditions.

In contrast, those not living near the river and proposing further studies and a full EARP review were not so concerned. However, several acknowledged the problem and indicated they supported the concept of flood control.

Some participants contended that several small dams would be a better solution to the flooding problem than the proposed Project. They argued that this alternative had not been considered. In fact, this alternative was advocated to the Saskatchewan Board of Inquiry in 1987. After evaluating its advantages and disadvantages, the Board concluded that "The small dam proposal will not result in lower construction or disruption costs and will not provide benefits to the same extent .... (and) therefore, concludes that the small dam proposal is not a viable alternative." (Board of Inquiry Report page 101) A copy of the relevant pages is provided in Appendix B.
In order to obtain additional information on this matter, I consulted with senior Environment Canada representatives. They advised that it would require 8 to 10 dams similar in size to the Boundary reservoir to achieve the same degree of flood protection as would be provided by the proposed Project. Even if one ignored the problems of finding suitable sites, this alternative would be more damaging to the environment, more costly and more difficult to operate in a manner that protects downstream users. Environment Canada representatives have advised that they would be prepared to discuss these matters with those that might be interested.

Some participants contended that flooding could be reduced if not solved, by reversing the trend of draining the upstream wetlands. The drainage of wetlands is an issue in these matters and will be considered later in this report. However, Environment Canada representatives have advised that this alternative would not provide sufficient flood control. As with the small dams alternative they would be prepared to discuss this matter with interested parties.

Participants at the Minot meeting reviewed the alternatives available to North Dakota to correct its flooding problems. Raising the level of the Lake Darling reservoir and constructing the Burlington dam would provide flood control for Minot. However, that approach would not resolve the flooding problems in Saskatchewan and would remove the 40 percent financing for the Project. Moreover, it would be a less satisfactory solution for North Dakota -- considerably more costly and greater environmental impacts - which presumably explains why it has not proceeded. In addition, it could expose Manitoba users to increased water quantity and quality problems.

In summary, flooding of the Souris River has caused suffering and financial burden for residents of the valley for decades and will continue to do so periodically until an effective flood control system is installed. The Rafferty and Alameda dams would control floods for the Souris Basin and represent the least costly alternative -- both in terms of financial and environmental costs. Quite understandably, there appears to be a different priority for resolving this problem with those potentially affected by future floods viewing it as urgent while those not affected relatively unconcerned.

5.2 The Need For Adequate Water Supplies

The Souris basin is a semi-arid area with low precipitation. The drainage system usually provides more than ample river flow during the spring months (periodically so much as to cause floods) but little during the rest of the year. In drought years, such as 1988, river flows are low, even in the spring period, and virtually non-existent the remaining months. Water is a very scarce resource in this area.

About 80 percent of the annual river flow has historically occurred during the spring runoff in March to May. During that period, the available water supply greatly exceeds requirements and the excess volume flows through the Souris system to eventually empty into Lake Winnipeg. However, for most of the year, water supply is limited and may be less than existing requirements. Water scarcity is especially troublesome in drought years and users are forced to find alternative sources, frequently at substantial cost and inconvenience. Residents of the valley naturally see logic in saving or conserving the excess supply during spring runoff and then utilizing it during the remainder of the year. Similarly, there is logic in storing flood waters for the drought years.

While the late 1960's and the 1970's were characterized by floods in the river, the last decade has seen a succession of dry years, the worst of which was 1988. Residents of the valley -- both farmers and ranchers as well as townspeople -- have suffered from inadequate water supply and see it as a major problem that needs resolution.

Indeed, a constant theme of valley participants at the public meetings was recounting their many water supply problems of recent years and commenting on how they would be significantly reduced with the water storage capability of the Rafferty-Alameda reservoirs.

Farmers and ranchers told how they had been forced to haul water to meet both their livestock and domestic requirements. Many have pumped their dugouts dry and are in a precarious position. Town representatives reported serious water shortages and indicated they had been forced to cease supplying local farmers and ranchers. Several participants indicated they had managed to survive because of a local water reservoir.

Limited water supply is a relatively common problem on the prairies and over the years governments have solved many of these problems by constructing reservoirs to store water for low precipitation periods. For example Lake Diefenbaker supplies Regina. Residents of the valley say "why not do the same for us?"

Another potential means of improving water supply is drilling wells to subsurface aquifers but several years of low precipitation has left this source seriously depleted. Furthermore, the quality of ground water in this area is reported to be relatively poor.

Participants from all sides contended that water management is essential for the basin. For those living in the valley, this objective translates into being able to conserve excess water in the spring and flood years so as to have water available for both the low flow months and drought years. They see the proposed Project as a means of achieving that target. Without a storage facility effective water management is not feasible and users are dependent on the vagaries of nature. However, there is a limit to what can be achieved by a storage system in severe drought years. The reservoirs would provide an assured water supply but they could not overcome the basic drought conditions and their impacts.

5.3 Environmental Impacts

The IEE identified the environmental impacts of the Project as related to the six areas of federal responsibility. Each impact was evaluated in terms of whether mitigation would be feasible. Additionally, Environment Canada reviewed available information to determine whether there are deficiencies in data required to fully evaluate the environmental impacts and consequently more studies may be required.

A summary of the IEE conclusions is provided in Table Two.

TABLE TWO: SIGNIFICANT ENVIRONMENTAL IMPACTS AS IDENTIFIED BY THE INITIAL ENVIRONMENTAL EVALUATION

- Waterfowl Production: Within Saskatchewan and North Dakota the Project would have significant adverse effects on waterfowl production. Complete mitigation of waterfowl impacts is feasible; mitigation and monitoring plans would have to be developed for North Dakota and Saskatchewan.

- Lake Darling Fisheries: The reduced flows entering North Dakota and associated water quality effects, would result in a decline and possible elimination of the fish population in Lake Darling. Mitigation options are limited but could include provisions for a fish refuge within the existing lake.

- Fish Habitat: The Project would result in losses of riverine habitat in Saskatchewan. These losses would be fully mitigated through replacement with reservoir habitat. The Project should achieve "no net loss" of productive habitat in Saskatchewan. In Manitoba the Project would result in the loss or alteration of productive fish habitat. Compensation by means of replacement habitat for this loss or alteration would be required.

- Federal Lands: Approximately 1700 ha of federal community pasture lands would be lost to the reservoirs. Full mitigation of impacts would be achieved through the replacement of pasture lands with lands of equal carrying capacity.

- Rare and Endangered Species (Plants and Animals): The Project would have significant adverse effects on the ferruginous hawk (THREATENED) and five plant species of national significance throughout inundation by the Saskatchewan reservoirs or altered downstream flows through to Manitoba. Opportunities for mitigation would be limited. Over the long term, information on the distribution and abundance of rare plant species in the flood plain is required for Saskatchewan and Manitoba.

- Navigable Waters: Both Rafferty and Alameda reservoirs would impact on navigation. Impacts and concerns for public safety can be mitigated through design and construction considerations, and proper marking of hazards to navigation.

Table Two identifies six significant adverse impacts. There would be significant adverse effects on waterfowl production in Saskatchewan and North Dakota but complete mitigation is feasible. The Lake Darling fisheries would decline and could possibly be eliminated. Mitigation options are limited. For Saskatchewan, there would be a loss of riverine habitat but "these losses would be fully mitigated through replacement with reservoir habitat." For Manitoba there would be a "loss or alteration of productive fish habitat" which could be compensated by replacement habitat. While some 1700 ha of federal community pasture lands would be lost, the impact could be fully mitigated. "The Project would have significant adverse effects on the ferruginous hawk (THREATENED) and five plant species of national significance.... and .... opportunities for mitigation would be limited." There would be impacts on navigation but they "can be mitigated."

Most of the significant adverse impacts could be fully mitigated but specific plans and arrangements would be required. However, some remaining significant adverse impacts appear likely.

The IEE also identifies nine significant information deficiencies as shown in Table Three. About one-half of the information deficiencies relate to modelling the potential impact on water quality and to water management of the basin. The remaining deficiencies relate to some of the mitigation requirements identified in Table Two to reduce environmental impacts.

TABLE THREE: SIGNIFICANT INFORMATION DEFICIENCIES AS IDENTIFIED BY THE INITIAL ENVIRONMENTAL EVALUATION

- Non-comparable data bases were used in studying the impact of the Project on the Souris River basin hydrology. The basic data for Saskatchewan from 1974 to 1981 should be reviewed and updated. The data in Saskatchewan and North Dakota should be updated to 1988. Reliable data on existing and proposed water uses is also lacking. These data are not required to assess the overall impact of the Project, but are critical for development of a water management plan.

- Operating criteria used in the hydrologic model have been evolving continually since the preparation of the SBDA's EIS. A water management plan should be developed which would include Saskatchewan's operation of the Project and operation of the national wildlife refuges in North Dakota.

- International water quality objectives against which impacts on transboundary water quality can be assessed do not exist. If the Project proceeds, formulation of international water quality objectives should be undertaken immediately for those parameters which are considered most likely to be affected.

- The EISs from the SBDA and the U.S. Army Corps of Engineers do not consider the collective impacts of the Project and the U.S. Souris River Basin Project on the quality of the Souris River at the North Dakota - Manitoba boundary.

- Comprehensive mitigation and monitoring plans for waterfowl production would be required.

- Insufficient information exists on fish habitat in the Souris River in Manitoba. Such information is required in order to accurately predict impacts of the Project on fish and to determine suitable compensation options in order to achieve "no net loss" of productive fish habitat. If the Project proceeds, abundance and habitat should be evaluated before the dam is operational.

TABLE THREE CONTINUED

- Information and data are lacking for comparative evaluations of habitat quality in the flooded area in terms of nesting and foraging value and the surrounding range for the ferruginous hawk.

- The distribution and abundance of rare plant species in the Souris River flood plain in Saskatchewan and Manitoba needs to be studied in more detail. Particular emphasis should be placed on the reach to be inundated by the Rafferty and Alameda Reservoirs.

- Rare plant species within the Souris River valley in North Dakota have not yet been identified.

Participants in the public meetings appeared to generally accept the IEE as a fair and critical assessment. Indeed, several organizations complemented Environment Canada on the quality of its report. Yet, some suggested there would be an additional environmental impact from the proposed Project because it "will destroy approximately 57 kilometres of valley that took thousands of years to develop by nature" (Rod MacDonald, Regina Meeting)

Groups proposing an independent panel and full review supported Environment Canada's identification of missing but required information. They contended that obtaining the missing information identified in the IEE is essential. Manitoba residents concerned about possible adverse impacts on water quantity and quality also stressed the need for complete documentation of impacts.

In contrast, participants who support the Project contended that the IEE tends to overstate the impacts. They believe that the proposed reservoirs would be a significant boon to wildlife and would counter the decline in numbers that has occurred during the recent drought years. They also see wildlife as being adaptable to new circumstances. Consequently, in their view, the Project would be of benefit to wildlife rather than causing negative environmental impacts. They also referred to the extensive plans by the developer to undertake programs that would ensure mitigation of any effects.

The conclusions in the IEE respecting endangered species engendered many comments by proponents of the Project. They tended to discount the impacts reported in the IEE by referring to the adaptability and flexibility of wildlife and considered several of the identified plants as being noxious weeds.

Clearly, participants' views about environmental impacts are mixed -- supporters of the Project contend there would be minimum to no environmental impacts (many actually expect a net gain), whereas opponents argue there would be major long term impacts one of which would be destruction of a river valley.

An important element in the consideration of environmental impacts is the degree to which they could be mitigated. The IEE identifies programs which would mitigate most of the impacts but to be effective the programs must be carried out and there must be assurance that this will actually occur. Furthermore, people must be kept informed as to actual progress.

However, even with full mitigation the Project would have some environmental impacts. The destruction of the portion of the valley that would be flooded could not be mitigated and some of the other impacts could not be completely overcome.

5.4 Conclusions

The identified environmental impacts must be balanced against the benefits obtained by providing flood control and secure water supply to residents of the valley. Several participants either directly or indirectly referred to this balancing process. For example, the Canadian Parks and Wilderness Society stated that it rejects the concept of "wildlife before people" and went on to state that "we must also ask what environmental costs and other costs should be borne by society at large for the economic gain of select groups, and where the balance lies" (author's emphasis). (Merv Hey, Regina Meeting)

Mr. Frank John, a supporter of the Project, expressed somewhat similar views at the Estevan meeting when he stated that "I doubt any project proceeds without some drawbacks that simply have to be weighed against the benefits the project will bring and that is clearly before us as I see it today" (Frank John, Estevan Meeting)

The mitigation of adverse environmental impacts should be an important element in the "balancing" process. The Estevan branch of the Saskatchewan Wildlife Federation introduced an interesting concept on mitigation. After commenting that the IEE "failed to include the mitigative measures set out by the Souris Basin Development Authority" it went on to indicate that the SBDA

> "has entered into an agreement with our branch .... which states that the Souris Basis Development Authority and the Estevan branch will co-operate in preserving downstream oxbows created by channelization, creating wildlife habitat along the Rafferty reservoir and maintaining islands created in the reservoir." (Wendy Bell, Estevan Meeting)

The concept of a developer working directly and co-operatively with concerned environmental groups to ensure mitigation is innovative and worthy of further consideration. It could ensure good communication and full opportunity for input and it could assist to resolve the apparent problem of trust between the parties.

If we assume the worst with respect to the two environmental impacts in the IEE that have only limited mitigation potential, proceeding with the Project would result in the loss of the Lake Darling fisheries and the loss of some populations of endangered species. It would also result in the permanent loss of a portion of a river valley. The basic question, then, is, are these losses more important than providing residents of the valley with relief from flooding and with adequate water supplies?

The North Dakota government has decided that it ranks flood control for its many Minot residents over the complete retention of the Lake Darling fisheries. That reduces the negative side of the balance sheet to a reduction in the population of rare and endangered species and the destruction of a portion of the river valley. For Manitoba

residents there is also the question of the impact of the project on water quantity and quality. However, that issue really relates to how the reservoirs would be operated rather than whether they are constructed and will be discussed later in this report.

Flooding and water supply are issues that have caused valley residents both suffering and financial burden for decades. It would appear to be very harsh treatment to decide that they can not obtain relief from these problems except by moving out of the area. A decision not to proceed would indicate that the environmental impacts are considered so important as to require that they be given priority over solving problems of the local residents. The impacts are significant but in my view not so compelling as to deny residents the opportunity to avoid floods and have secure water supplies.

6.0 CONSIDERATION OF SECONDARY ISSUES

The Project is expected to serve several secondary objectives - provide water for Shand power plant cooling, for municipal needs and for irrigation as well as water-based recreation and providing opportunities for economic development. Operation of the proposed facilities also raises a number of issues about potential impacts on downstream users - particularly in terms of water quantity and quality. These issues raise the question about the need for water management in the basin. Additionally participants at the meeting identified a series of issues that requires consideration.

6.1 Water Requirements and Available Supply

The IEE describes the operation of the Project as follows:

> "The reservoirs would regulate the naturally extremely variable flows of the river by reducing the peak discharge during spring floods and increasing flows throughout the remaining part of the year. This means that water would be available for such uses as power plant cooling water, irrigation, municipal water supply and recreation."

Studies by Environment Canada, simulated the hydrologic system using historical data. They indicate that the annual Shand cooling water requirements could be met "except perhaps through the first part of the initial filling period."

The hydrologic studies indicate that the full requirements for irrigation for 4800 ha "could be supported 80 percent of the time from Rafferty Reservoir .....(but)..... The operating scenarios assumed that there would be no irrigation until Rafferty reservoir reached the working supply level."

Opponents contend that the Project:

> "is designed to put in place a number of very costly consumptive uses of water. For example, despite acknowledged water scarcity, forced evaporation by two thermal power plants would total 12,500 cubic decametres. That's an amount that is three times the present municipal consumption of Weyburn and Estevan combined" (Bert Weichel, Estevan Meeting)

Some argued that the decision to proceed with the power plant was a mistake and that other alternatives were available but were not selected. For example, electric energy could have been purchased from Manitoba Hydro at lower cost or Saskatchewan could conserve energy and thereby reduce the demand.

At the Regina meeting, Saskatchewan Power reported that its "mandate and responsibility is to meet the electric energy demands of our customers and at minimum cost with a consistent high degree of reliability." (Bob Lawrence, Regina Meeting) It advised that electric energy consumption had increased 8 percent in 1988 and is projected to increase by 2.5 percent annually for the next ten years after allowance for "effects of load management and conservation." That growth rate was compared to the average Canadian rate of about 3 percent and to the United States rate of 2 percent.

Saskatchewan Power also commented on the long period required for planning and getting new projects in place. It stated that in the late 1970's it considered generation alternatives and "held several public meetings to obtain public input." Studies "were refined in the 1980's .... to decide how best to meet the forecast demand on a long-term basis." It considered the following alternatives:

- a new lignite-fired station at Shand;
- a new lignite-fired station at Poplar River; and
- a 300-megawatt purchase from Manitoba.

> "the long-term generation costs were estimated for each. A comparison of these costs showed that the two thermal options are essentially equal, while the purchase option from Manitoba increased Saskatchewan Power's accumulative costs considerably ....(and).... would take away from the province the economic activity associated with the major projects ....(and).... prevent the creation of 260 to 360 permanent jobs in Saskatchewan."

It stated that "we will need Shand in 1992 or we will not be able to meet the electric demand of the province."

Opponents also criticize the use of water for planned irrigation. Some argued that the uncertainties of supply coupled with the high investment cost would make irrigation economically unattractive. Others contended that irrigation was a poor practice per se - "if you can't grow crops without the assistance of rain and you have to irrigate, then you shouldn't be growing those kinds of crops there, you should look at other uses for that land." (Ruth Pryzner, Brandon Meeting)

On the other side, farmers and ranchers in the valley indicated that irrigation is a means of solving the problems of low precipitation and drought thereby making the land more productive.

If the Project does proceed, then consideration must be given to how the conserved water should be used. The Shand power plant's requirements for cooling represents

about 10 percent of the mean annual flow. Generation alternatives have been considered by Saskatchewan Power and the low cost alternative selected. The decision to choose water over air cooling for Shand also saved about $20 million. Additionally, all of the effluent from the Estevan sewage lagoons will be used by the Shand plant, thereby eliminating the annual release into the Souris River. Having regard for these facts, the use of stored water for Shand cooling appears reasonable.

Another use for conserved water would be to supplement municipal sources. None of the participants commented on this proposed use and it should have a high priority.

The plan to use some of the water for irrigation also appears reasonable having regard for the low precipitation which is a major impediment to productive agriculture. However, the basin is plagued with uncertainty about future precipitation and consequently there is a need to move cautiously. Additionally, there is some uncertainty about ensuring downstream water quality. Therefore, there would be merit in deferring plans for irrigation until these uncertainties have been resolved.

6.2 The Need for Water Management

As stated by the Saskatchewan Natural History Society "living with drought requires careful use and management of the region's limited water resources. Long-term planning is essential to minimize drought impacts." (Jim Elliott, Regina Meeting) The concept of long-term planning and the effective management of available water resources in the whole basin was endorsed by participants on both sides.

The proposed reservoirs would provide the means of long-term management by enabling the storage of water during periods when flows exceed requirements and then making water available during periods when requirements exceed the natural flow.

However, interfering with the natural flow regime can potentially impact on downstream users in both quantity and quality. The IEE indicates that representatives for the governments affected have already considered an operating plan. The IEE states that:

> "On January 13, 1989 representatives from the governments of Canada, United States, Saskatchewan, North Dakota and Manitoba agreed upon a draft operating plan for the Project in Saskatchewan together with coordinated operation in North Dakota. Under this plan, the Rafferty and Alameda dams would be operated to
>
> - comply with international apportionment obligations;
> - provide water for existing authorized uses in Saskatchewan;
> - provide water for the Shand Thermal Generating Station; and
> - provide water for new authorized uses in Saskatchewan.

> Flow passed to North Dakota would be either a minimum of 40 or 50 percent of the natural flow at Sherwood Crossing depending on whether the year is wet or dry. The 1959 Interim Measures must be modified to facilitate the storage of up to 60 percent of the natural flow by Saskatchewan."

Environment Canada made studies of the hydrologic impacts using a computerized water balance model. These studies indicate that under the draft operating plan:

> "The 50:50 apportionment would be applied most of the time. The 50:50 option, with full irrigation of 4855 ha and cooling of the Shand Thermal Generating Station, has the potential for creating the most severe low flow conditions and greatest stress on water quality. Therefore, evaluation of Project impacts on water quality focuses on this scenario."

In summarizing the results of its studies, Environment Canada states:

> "In Manitoba water quality at the international boundary is not expected to be altered significantly by the Saskatchewan reservoirs under average and high flow conditions.....However, water quality under low flow conditions may be affected because the United States would deliver to the Manitoba boundary only sufficient water to meet the requirements of the Interim Measures."

In commenting on the relationship between low flows and water quality, the IEE states:

> "The flow of the Souris River is a dominant factor affecting water quality. Generally, reduced flows can result in deteriorated water quality, particularly for such characteristics as dissolved gases (oxygen and ammonia) and dissolved salts. Low flows favour naturally occurring biological communities that respond to shallower water (e.g. macrophytes), higher temperature and greater nutrient availability."

Manitoba participants expressed mixed views respecting the potential impacts - some were confident that water quality would not be worse than today whereas others expressed serious concern and argued for further studies.

Several participants contended that in order to protect downstream users, there needs to be an inter-jurisdictional management body that ensures that water management is effective. The Mayor of Melita stated it most clearly in suggesting that "The future planning, development, and operation of all activities and works, including all existing

works, should fall under the management of an interprovincial and international citizens' government board." (Ken Carels, Melita Meeting)

The protection of downstream users is generally ensured by the 1959 Interim Agreement. However, it does not specifically address the matter of water quality. Environment Canada studies have shown that under low flow conditions water quality might suffer with the operation of the Saskatchewan reservoirs. However, it appears that this possibility could be avoided by adjusting the release rate from the reservoirs during low flow periods. The IEE identifies a number of mitigative measures that could be taken to avoid water quality impairments.

There appears to be considerable merit in the suggestions that water management in the Souris basin should become a coordinated operation involving participation by all jurisdictions. Not only would it ensure input by each jurisdiction but it would also improve communications. The development of innovative management programs would permit the proposed reservoirs to benefit all parties.

The management process should also ensure input from the public. Residents of the valley clearly need to have input because they are directly affected but other groups, such as those making submissions at the recent meetings, also need to be involved. That process would help avoid the many misunderstandings that currently exist and would minimize the areas of disagreement.

To be effective, the management body should include representatives from Saskatchewan, Manitoba and North Dakota as well as the two federal governments. There would need to be a dispute resolution process in place to resolve disagreements. Possibly, the International Joint Commission could be convinced to take on that responsibility.

6.3 Issues Identified by Participants

6.3.1 Pumping Ground water To Fill The Reservoirs

Several participants expressed concern about the possibility that the Project operator would use aquifer resources to fill the reservoirs. This may be simply a misunderstanding because as far as I know the SBDA has not indicated it plans to take this action. Using ground water supplies to fill the reservoir would be inconsistent with the basic intent of averaging out stream flows. It could also add further complications to water quality for downstream users. Therefore, it would be desirable to condition any licence by prohibiting the use of ground water supplies.

6.3.2 Drainage Of Upstream Wetlands

There was virtually unanimity by participants that the continued drainage of upstream wetlands should cease. Not only does the practice increase flooding problems but it destroys wildlife habitat. Since some of the remaining wetlands are privately owned, action to prevent drainage must include means of arranging with owners to not proceed with further drainage. Some form of compensation may be required. It should be noted that this issue was considered at the Saskatchewan Board of Inquiry meetings and it recommended several conditions be attached to the permit to prevent further drainage.

6.3.3 Evaporation Of Stored Water

Those opposing the Project frequently referred to predicted high evaporation rates from the reservoirs. They appeared to conclude that this feature demonstrated the futility of water storage or inadequacies in the proposal. However, loss of stored water by evaporation is an inevitable consequence of storing water. One can avoid evaporation loss by not storing water and instead continue the present system of permitting the water from spring runoff and floods to flow through the river system in a few short weeks and empty into Lake Winnipeg. However, that option provides no water for the remaining low flow months or for drought years. Indeed, it prevents sensible water management which most participants favoured. Therefore, one has to accept that if river flows are going to be managed there must be storage of some sort and that will inevitably result in evaporation. Under certain conditions the evaporation may be substantial but there will always be more water available for low flow periods under that system than under the current natural flow system.

6.3.4 The Significance of Timing

Several participants asked "what's the rush?" If the project is valid it will still be viable next year. They contended that further studies are required and there is a need for a complete EARP review. Yet, for those residents of the Valley facing the possibility of being flooded out or having to cope with inadequate water supplies, there is considerable urgency.

6.3.5 Sustainable Development

The new policy of sustainable development is used by each side to defend its position. Both sides agree on the definition of sustainable development - "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (Len Gustafson, Estevan Meeting; Jim Elliott, Regina Meeting) However, when each side applies the definition to the proposed facilities they end up

with contradictory conclusions. Unfortunately, they do not usually provide any explanation for their conclusion and consequently one cannot examine its rationale.

One way of assessing the "sustainability" of the proposal is to compare its expected results with current operations. Currently, periodic spring floods have a damaging impact on agricultural land and reduce production. Lack of adequate water supplies during the remaining months and drought years also have a negative impact on agricultural production. Both of these conditions would be improved by construction of the proposed reservoirs and the adoption of a sound water management program. Under those conditions, the valley could usually sustain agricultural operations at reasonable levels for the long-term whereas today agriculture is more exposed to the vagaries of nature and less sustainable.

Some participants viewed the proposed irrigation operations as being in conflict with the concept of sustainable development. However, that view is clearly not shared by the Brundtland Commission because in its report, Our Common Future, when considering the question of Food Security: Sustaining the Potential, it states on page 134:

> "Improvements in water management are essential to raise agricultural productivity and to reduce land degradation and water pollution. Critical issues concern the design of irrigation and the efficiency of water use.
>
> Where water is scarce, an irrigation project should maximize productivity per unit of water; where water is plentiful it must maximize productivity per unit of land. But local conditions will dictate how much water can be used without damaging the soil. Salinization, alkalization and water-logging can be avoided by a more careful approach to drainage, maintenance, cropping patterns, the regulation of water quantities, and more rational water charges. Many of these objectives will be easier to realize in small-scale irrigation projects. But whether small or large, the projects must be designed with the abilities and aims of the participating farmers in mind, and then involve them in the management."

The current proposal to conserve excess water supplies during high-flow periods and use them during low-flow periods appears completely compatible with sound water management and sustainable development. As the Brundtland Commission report indicates, the effective use of scarce water resources could sustain agricultural production from the area for the long-term. Moreover, that objective could be achieved "without compromising the ability of future generations to meet their own needs." Indeed, the proposed facilities would assist future generations provided the management is effective.

6.3.6 Water Quantity and Quality At the North Dakota - Manitoba Border

The IEE indicates that:

> "In Manitoba, water quality at the international boundary is not expected to be altered significantly by the Saskatchewan reservoirs under average and high flow conditions..... However, water quality under low flow conditions may be affected because the United States would deliver to the Manitoba boundary only sufficient water to meet the requirements of the Interim Measures." (IEE page 6-66)

Several Manitoba participants expressed serious concern about the impacts the Project might have on water quantity and quality in their province. The Honourable Glen Cummings, Minister of the Environment, expressed Manitobans' concerns about these matters when he stated that:

> "the Souris River appears to have only two normal stages, either a drought or a flood. It is essential that means be found to co-operatively manage not only the fluctuating flows of the river, but to provide protection of the quality of the waters of the river. The challenge is to find the means by which this can be accomplished, a means that must ensure that the benefits outweigh the costs, and that the benefits to one party are not achieved at the expense of others who have to rely on the waters of the river." (Glen Cummings, Melita Meeting)

The Minister also raised the question of the 1959 Interim Agreement and its effect on Manitoba particularly in relation to water quality. He advised that:

> "Manitoba, in early negotiations in respect to the international agreement required by this proposed project indicated that it hoped during the negotiation process, to obtain an adjustment to the interim measure to provide also for the minimum flow to Manitoba during the winter months. Later in negotiations, in response to the refusal of the United States interests to discuss increases in the guaranteed flows, Manitoba reluctantly withdrew its proposal.....Manitoba will be carefully considering its water needs on the Souris River and will, at the appropriate time be requesting the IJC to reconsider the appropriateness of the existing limited flow guarantee." (Glen Cummings, Melita Meeting)

The Minister's proposal to find a means "to co-operatively manage not only the fluctuating flows of the river, but to provide protection of the quality and of the waters

of the river" seems eminently sound. It is consistent with providing flood control and adequate water supply which, in turn, are compatible with protecting water quality for downstream users.

Some Manitoba participants were satisfied that the proposed Project would not adversely affect either the quantity or quality of water at the North Dakota boundary.

The Manitoba government and several other participants contended that the Federal Minister should appoint an independent review panel and proceed to a full review. They referred to the information deficiencies respecting hydrologic studies and argued that all of these data gaps need to be corrected.

It is understandable that Manitoba residents are concerned about how the Project would impact on their water quantity and quality. There appears to be two basic ways to approach this problem. One alternative is to make a complete range of studies under varying circumstances to estimate the impact. However, to make realistic estimates requires knowing how the system would operate in Saskatchewan and North Dakota under widely varying circumstances. That information is almost impossible to obtain. A second alternative is for the parties to agree on a water management program and standards that would specify the conditions that must be met. For example, proceeding with the Project could be subject to a condition that under low flow conditions, the water quantity and quality at the North Dakota - Manitoba border would be no less than it would have been had the Project not been constructed. That process deals directly with the problem and meets Mr. Cummings request of "protection of the quality of the waters of the river." The approach would require careful monitoring and planning but that could be achieved through an effective basin-wide water management system which would include Manitoba representation.

7.0 THE ENVIRONMENTAL REVIEW PROCESS

7.1 The Saskatchewan Review Process

Several of the Project's opponents criticized SBDA because it had not considered other alternatives. SCRAP contended that "The public distrust of the conclusions reached by the Government of Saskatchewan is because we don't have access to all of the information, and because we never had a role in the decision-making process". (Rod MacDonald, Regina Meeting) Others referred to the fact that only the Saskatchewan portion of the basin was considered and that meetings by the Board of inquiry were not held in Manitoba.

In retrospect one can appreciate the concerns of the environmental groups and the downstream users about how the proposal would impact on them. The IEE has identified potential problems which would require co-ordinated action by all jurisdictions. As indicated in Section 6.2, there is a need for basin-wide water management.

7.2 The Federal Review Process

The federal Environmental Assessment Review Process has two phases: initial assessment and public review by a panel. The initial assessment phase is intended to be a screening process to determine whether there are potential environmental impacts that could result from a proposal. If the initial assessment indicates "the potentially adverse environmental impacts that may be caused by the proposal are significant" or if "public concern about the proposal is such that a public review is desirable" then the Minister must refer the proposal for review by an independent panel (Environment Assessment and Review Process Guidelines Order).

Participants who were concerned about the impacts of the Project contended that since the IEE has identified significant environmental impacts and since there is clearly public concern, then the next stage of public review is necessary. Supporters of the Project took the opposite approach and argued that the proposal had been "studied to death", that the environmental impacts are not significant and that it is time to get on with the Project.

The proposed Project does not neatly fit into any of the normal categories. It has been studied in one form or another for decades and was part of a four-year study in the 1970's with public meetings. The current proposal was evaluated in an EIS by SBDA and then reviewed publicly by a Saskatchewan Board of Inquiry. The issues discussed at the 1987 public meetings appear almost identical to those identified at the recent meetings to consider the IEE except for the concerns of Manitoba residents about potential impacts on water quantity and quality at the North Dakota border. Additionally, the participants at the 1987 and 1989 meetings are very similar.

The IEE prepared by Environment Canada is a much more comprehensive review than normally is made for an initial evaluation - indeed, it draws on all the available data much of which is available because of the many previous studies and it has been generally accepted by participants as being a fair summary of environmental impacts for the six areas of federal responsibility. Some participants have suggested that an additional significant impact is the destruction of the valley due to inundation.

The IEE indicates that most of the significant impacts can be fully mitigated but mitigation and monitoring programs would have to be developed. Additionally, missing information would need to be researched. One of the remaining impacts (Lake Darling fisheries) is in North Dakota and that government has indicated it is prepared to accept that impact in order to obtain flood control. The remaining significant impact identified by the IEE relates to certain rare or endangered species and here there is some potential for mitigation but probably not completely. Obviously, mitigation is not feasible for the "destruction of the river" impact.

Thus, there are two adverse environmental impacts which must be balanced against the benefits from the Project - in particular flood control and secure water supply. Evaluating these trade-offs is the primary outstanding issue.

Following the standard EARP review process would involve:

- appointing a panel:
- establishing terms of reference;
- identification of issues and the establishment of guidelines for an EIS;
- preparation of an EIS;
- hold public meetings; and
- write a report for the Minister summarizing the views of participants and presenting recommendations.

In this very unique case, essentially all of the foregoing steps have been completed. On the basis of public meetings in 1987 and 1989, the issues are clearly identified. SBDA prepared an EIS that dealt with Saskatchewan matters, the current IEE deals with issues of federal responsibility beyond Saskatchewan's borders. Public meetings have been held to review both documents. The Board of Inquiry issued its report in 1988 and this report summarizes the 1989 meetings.

The review process is at the point where both the environmental impacts and the benefits from the proposal have been identified.

A decision is required as to whether the Project should proceed in spite of those environmental impacts or whether they are sufficiently compelling to reject the proposal.

Proceeding on a new round of review and public meetings will not alter the need for that decision. The participants will reiterate their conflicting views and after the process is complete the same decision will have to be made.

Moreover, proceeding with an additional review phase in this unique case may well lead to complications because of the mixture of jurisdictions. How can a Canadian review panel convene meetings in North Dakota to make recommendations to a Canadian minister? Proceeding in this manner could result in the final decision being deferred for several years.

Residents of the valley have been urging the Saskatchewan government to institute flood control and secure water supply for decades. In 1984, they believed their requests had been accepted. In 1989, the issue is still unsettled. It seems to me that they deserve to know one way or the other in order that they can get on with their lives.

7.3 Possible Mediation Process

While it appeared at the June 1989 meetings that participants were advocating two diametrically opposed positions, this is probably misleading and there is more consensus than appears on the surface. There are three basic issues that appear to be preventing agreement between the parties.

1. Are the proposed dams the best way of achieving flood control and adequate water supply?

2. Can Manitoba users be protected from adverse impact from the Project on their water quantity and quality?

3. Can appropriate mitigation and monitoring programs be developed and will they be effectively pursued?

The answers to each of these questions is vital in how one views the Project. Each of them is technically complex but participants have not had any opportunity of reviewing the information with technical specialists. Consequently, suspicion and doubt has let to widely differing views. But these differences could be resolved by providing all parties with the necessary technical information. Furthermore, Environment Canada technical specialists are in an ideal position to provide this information because they have studied each of the issues and are impartial.

Additional comments respecting each of these issues is provided below.

7.3.1 Are The Proposed Dams The Best Alternative For Flood Control and Adequate Water Supply?

Submissions at the June 1989 meetings suggest that almost all participants agree that residents of the valley should be protected from flooding and should have adequate water supplies. However, opponents to the Project believe that there are better ways of achieving these objectives than the proposed facilities. As indicated in Section 5.1, technical studies do not support that view. I believe it would be desirable to provide participants with available technical information in order that they can take it into account in reaching their own conclusions. Environment Canada could convene meetings to arrange for this exchange of information.

7.3.2 Can Manitoba Users Be Protected From Adverse Impacts From The Project On Their Water Quantity And Quality?

The studies conducted by Environment Canada specialists indicate that under certain conditions both the quantity and quality of water at the Manitoba - North Dakota border could be adversely affected by the Project. However, these findings are based on mathematical models, historic data and assumed mode of operation in both Saskatchewan and North Dakota. There are inherent uncertainties in such studies and rather than relying on model results for a maze of different and probably extreme operating circumstances, a different approach would be for the various jurisdictions to agree on certain standards that must be met in a basin-wide management program. It would appear reasonable for one of these standards to require that water quantity and quality at the Manitoba border would not be worse than it would have been without the Project. Indeed, it would seem reasonable to assume that an innovative and well co-ordinated basin operating plan should be able to provide benefits to all jurisdictions including more water to Manitoba during low flow conditions. The existing inter-jurisdictional technical committee would be a suitable body to establish the necessary standards to protect Manitoba. Environment Canada representatives could initiate the discussions which would only relate to potential impacts of the Project and how to avoid them. They would not relate to renegotiating the 1959 Interim Agreement which is a separate issue.

7.3.3 Can Appropriate Mitigative And Monitoring Programs Be Developed And Will They Be Effectively Pursued?

While the IEE indicates that most of the significant environmental impacts can be mitigated, there is undoubtedly question and suspicion within the environmental organizations as to whether the necessary programs will be developed and fully

implemented. Additionally, there are the several information deficiencies identified in the IEE that relate to mitigation programs. The Estevan branch of the Saskatchewan Wildlife Federation and SBDA have pioneered an approach to mitigation that ensures input and involvement by an environment organization. Both parties have probably benefitted from that kind of arrangement. That model of co-operative participation could be extended to the full basin-wide area of mitigation and monitoring. Environment Canada could play a key role in that process by convening meetings with the parties to explore possible arrangements. Development of the specific mitigative and monitoring programs would remain the responsibility of the developer but would have to meet certain conditions in the licence. A co-operative system would ensure that environmental organizations have input and involvement in the process and thereby able to actively participate in the decision-making process.

8.0 CONCLUSIONS

My impressions of the proposed Project lead me to conclude that:

- residents of the Souris River Valley need to be relieved of the threat of periodic floods and the frequent problems of inadequate water supply;

- the proposed Project would achieve both of these objectives in the least costly manner for the basin and with minimum environmental impact;

- there would be environmental impacts, the most serious being destruction of a significant portion of the existing river valley;

- while those impacts would be unfortunate, they are justifiable when compared to the alternative of either requiring residents to accept the twin calamities of flood and inadequate water supplies or leave the valley;

- if a licence is issued, it should be conditional to ensure that mitigation of environmental impacts is achieved, that ground water is not pumped to help fill the reservoir, that drainage of the wetlands be discontinued and such other matters as seem appropriate;

- the proposed dams can be operated in a manner that would protect Manitoba users with respect to both water quantity and quality; arrangements should be made to ensure that this is achieved should the project be approved;

- arrangements should be made to implement a basin-wide water management plan that would include representation from Saskatchewan, Manitoba, North Dakota and the two federal governments. The management plan should ensure participation from residents of the valley and environmental organizations;

- arrangements should be made for a dispute resolution process for the management process;

- because the threat of serious floods is real and the problem of inadequate water supply almost constant, there is an urgency to get these facilities in place and commence an effective water management program;

- the public's concerns and views respecting the proposed Project were identified at either the 1987 public meetings of the Saskatchewan Board of Inquiry or at the June, 1989 public meetings to consider the IEE;

- additional information would not assist in deciding the basic issue of the relative importance of the identified environmental impacts and the Project's benefits - flood control and managed water supply;

- a further public review of the Project by an independent panel would not contribute to the resolution of this problem - the issues are known and the public has expressed its views at two sets of public meetings;

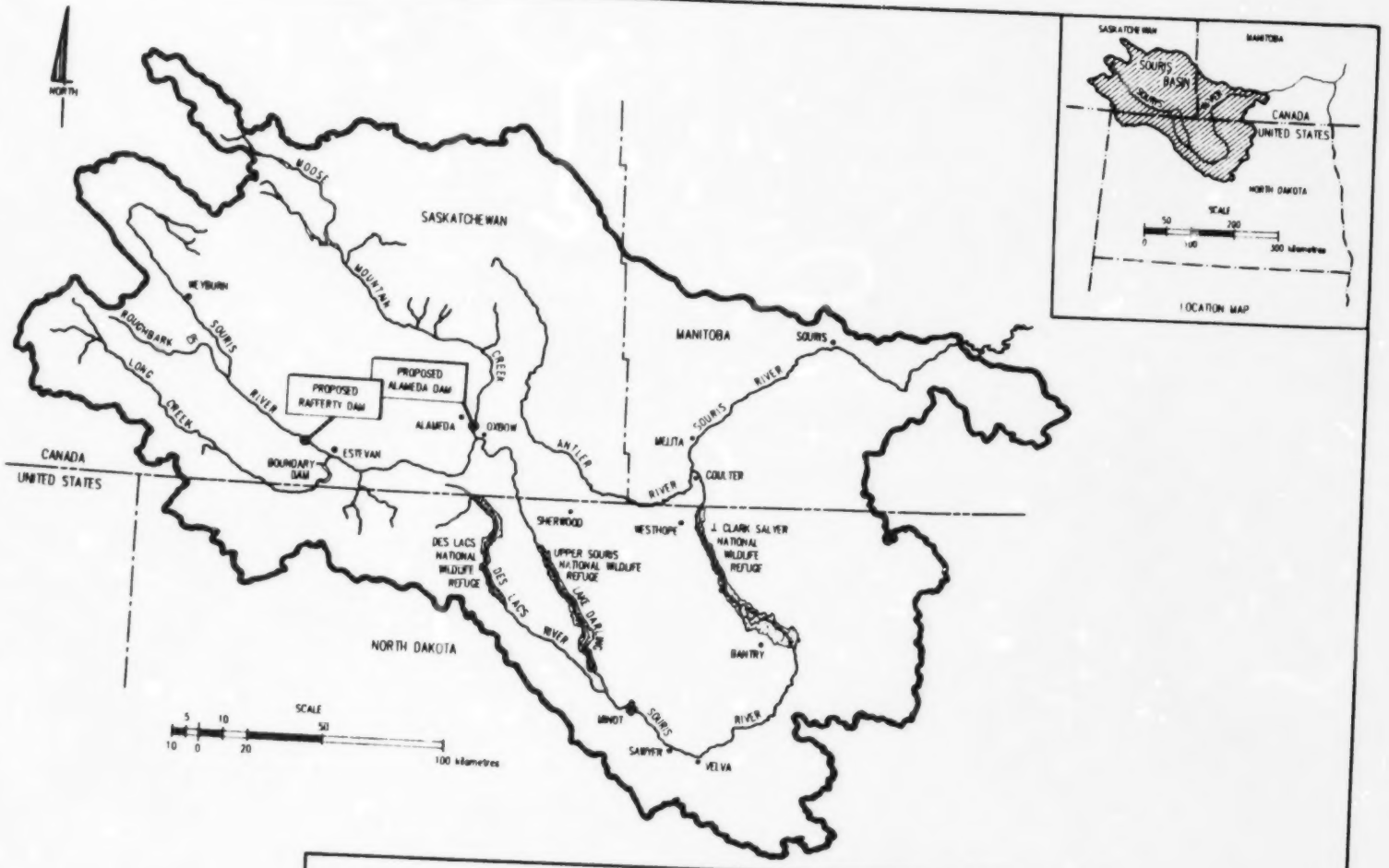
- proceeding with a standard EARP review could lead to serious complications and delays because of the international aspects of the process;

- a mediation type process could be initiated by Environment Canada to involve the public and the developer respecting:
    - the best way of achieving flood control and adequate water supply;
    - protecting Manitoba from deterioration in water quantity and quality; and
    - appropriate mitigative and monitoring programs; and

- the Minister should proceed to make his decision with respect to issuing a licence subject to certain conditions as outlined above or reject the Project as having too serious environmental impacts.

APPENDIX A

FIGURES FROM IEE



Environment Canada / Environnement Canada
Conservation and Protection / Conservation et Protection

Rafferty – Alameda Project Initial Environmental Evaluation

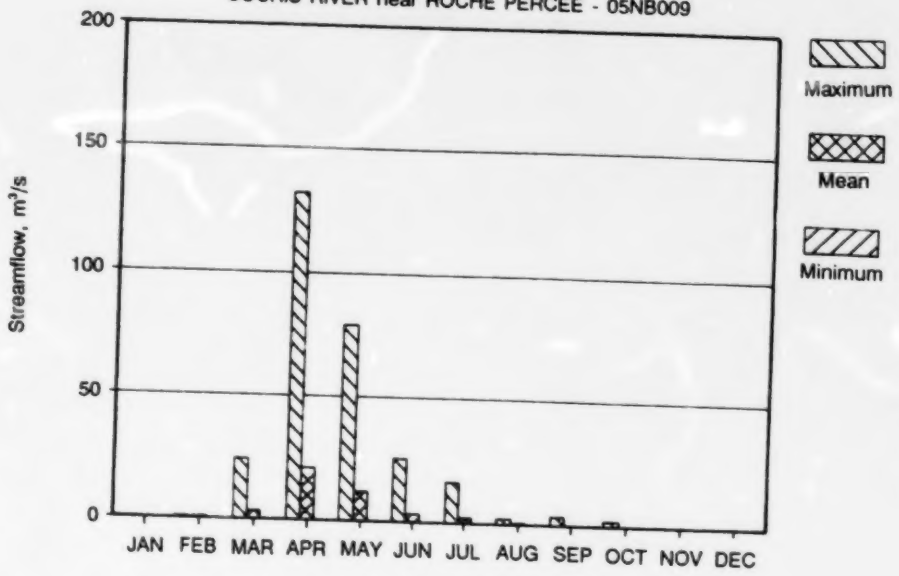
FIGURE: 4.1 Souris River Basin Map

DATE: July, 1989

SOURCE: Environment Canada Conservation and Protection

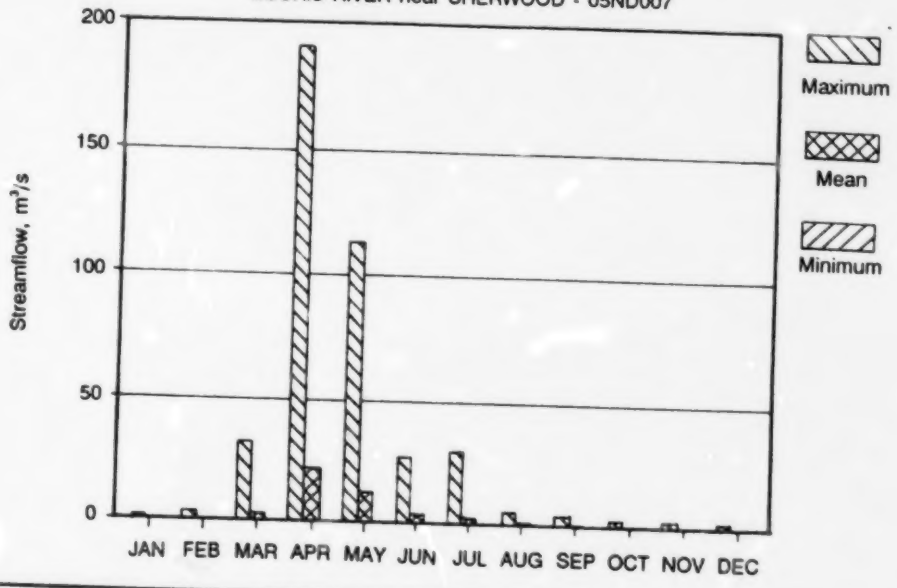
RECORDED MEAN MONTHLY FLOW

SOURIS RIVER near ROCHE PERCEE - 05NB009

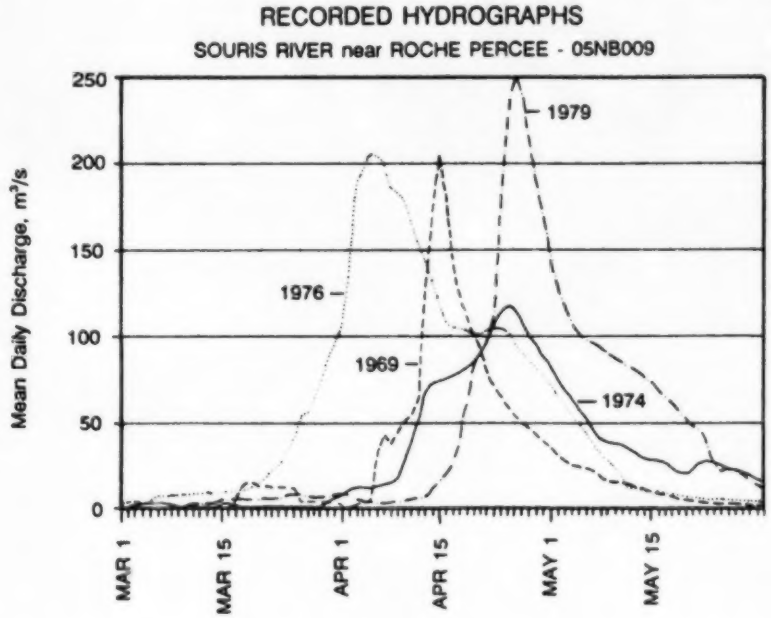


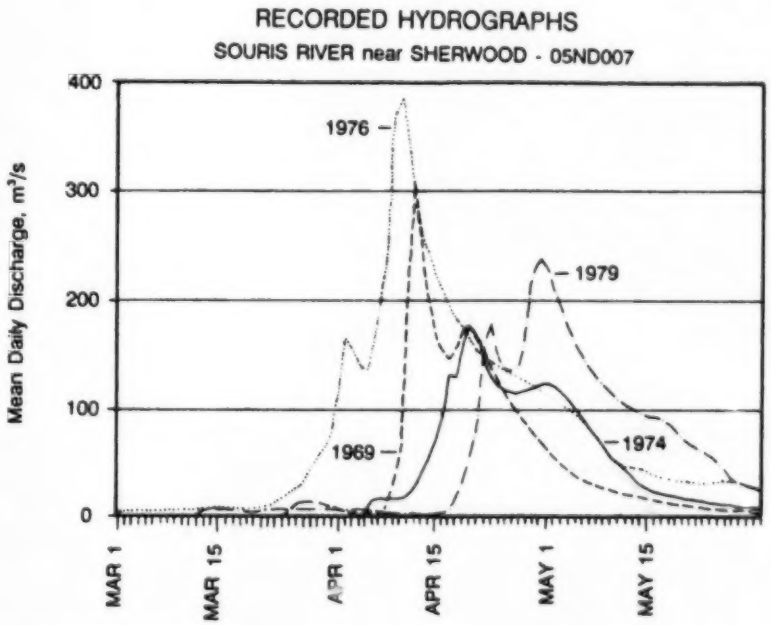
RECORDED MEAN MONTHLY FLOW

SOURIS RIVER near SHERWOOD - 05ND007



Environment Canada / Environnement Canada Conservation and Protection / Conservation et Protection	**Rafferty – Alameda Project** **Initial Environmental Evaluation**
DATE: July, 1989	FIGURE: 5.1 Recorded Mean Monthly Flow
	SOURCE: Environment Canada Conservation and Protection





Environment Canada / Environnement Canada Conservation and Protection / Conservation et Protection	**Rafferty - Alameda Project** **Initial Environmental Evaluation**
	FIGURE: 5.3 Recorded Flood Hydrographs
DATE: July, 1989	**SOURCE:** Environment Canada Conservation and Protection

APPENDIX B

THE RAFFERTY - ALAMEDA BOARD OF INQUIRY SMALL DAMS ALTERNATIVE PROPOSALS

NOTE: This is taken from the Rafferty-Alameda Board of Inquiry Final Report, Page 100 - 101.

ALTERNATE PROPOSALS

Proposals for alternate development were put forward during the public meetings. The alternative proposal most frequently aired recommended the construction of a series of small dams along the Souris River and Moose Mountain Creek. In view of the frequent references to this proposal, the Board considered it further.

The advocates of the small dam proposal agree that such structures would provide the flood control required by residents along the river at a reduced cost, both monetarily and in terms of environmental disruption. Small dams, it is said, will take up less area and hence cause less disruption to farms along both waterways. Clearly, certain multi-use objectives such as large scale recreation developments and water provision for industrial development would not be achieved. However, to the residents supporting the alternative proposal, these objectives are not a priority.

The Board duly considered the reduction in potential uses with the overall cost of building small dams. In analyzing the alternative proposal the Board found that small dams are less efficient than large dams for the following reasons:

1) small dams flood a greater area to achieve the same storage volume - that is more land would be required with greater negative impact on wildlife, archaeology, and agriculture;

2) surface area-volume ratio would be changed resulting in proportionately greater evaporation;

3) small dams are more costly to construct, operate and maintain;

4) small dams increase the potential for "breaching" in major floods;

5) small dams allow limited recreational and fisheries potential;

6) small dams offer poorer water quality; and

7) small dams would not have an adequate supply of water for irrigation.

If both proposals serve to guarantee the same amount of flood protection, and such, start from the same base, they must then be analyzed on the basis of other benefits and their relative cost. Viewed in these terms, the SBDA proposal is more efficient since it provides greater benefits at similar or lower costs. The small dam proposal will not result in lower construction or disruption costs, and will not provide benefits to the same extent.

The Board, therefore, concludes that the small dam proposal is not a viable alternative to the large dam proposal.